

In the Specification:

On page 1, after the title insert the following:

RELATED APPLICATIONS

This is a U.S. national stage of application No. PCT/DE2004/002476, filed on 09 November 2004. This patent application claims the priority of German patent application no. 103 53 215.3 filed November 13, 2003, the disclosure content of which is hereby incorporated by reference.

FIELD OF THE INVENTION

On page 1, before line 11, insert the following heading:

BACKGROUND OF THE INVENTION

On page 1, amend the paragraph beginning on line 11 as follows:

Such laser devices are known, for example, from U.S. Patent No. 6,954,479 B2 ~~printed documents WO 01/93386 and WO 02/067393~~, the content of which is incorporated in the present description by reference. In the printed documents, surface-emitting semiconductor laser devices are described, the active element of the vertical emission region of which is formed by a quantum well structure which is optically pumped by adjoining edge-emitting semiconductor lasers. Pump radiation source and quantum well structure are epitactically grown on a common substrate. The monolithically integrated arrangement thus produced saves space and can be inexpensively produced. Furthermore, the production process ensures accurate positioning of pump radiation source and vertical emission region with respect to one another.

On page 2, before line 1, insert the following heading:

SUMMARY OF THE INVENTION

On page 2, delete the paragraph beginning on line 9 through line 12 in its entirety.

On page 2, amend the paragraph beginning on line 14 as follows:

According to the invention, it is provided that the at This and other objects are attained in
accordance with one aspect of the present invention directed to an optically pumped
semiconductor laser device having a surface-emitting vertical emission region and at least one
monolithically integrated pump radiation source for optically pumping the vertical emission
region. At least one pump radiation source is set up and arranged in such a manner that the pump
radiation enters the vertical emission region in the form of partial bundles of rays of radiation
with different radiation directions so that the pump radiation and the fundamental mode of the
vertical emission region have an overlap which is suitable for the excitation of this fundamental
mode. A bundle of rays is the spatial totality of rays or beams. Partial bundles of rays (referred
to hereafter as "partial bundles") means that at least two bundles exist, each bundle comprising a
part of the pump radiation.

On page 4, before line 28, insert the following heading:

BRIEF DESCRIPTION OF THE DRAWINGS

On page 5, before line 21, insert the following heading:

DETAILED DESCRIPTION OF THE DRAWINGS

On page 5, amend the paragraph beginning on line 37 through page 6, line 14 as follows:

A suitable semiconductor layer sequence for implementing this or one of the other exemplary embodiments of a semiconductor laser device, shown in the context of the present application, can be found, for example, in the above-mentioned U.S. Patent No. 6,954,479 B2 ~~one of the printed documents WO 01/93386 or WO 02/067393 mentioned initially~~. The vertical emission region 1 can have, for example, quantum well structures as active amplifying regions, the designation quantum well structure comprising any structure in which charge carriers are subjected to a quantization of their energy states due to confinement, in the context of the application. In particular, the designation quantum well structure does not include any information about the dimensionality of the quantization. Thus, it comprises, among other things, quantum troughs, quantum wires and quantum dots and any combination of these structures.

On page 7, amend the paragraph beginning on line 1 as follows:

It is advantageous in this context if the absorption coefficient of the pump radiation in the vertical emission region 1 is adjusted in such a manner that the absorption of the pump radiation in the edge region of the vertical emission region 1 is not too high strong to avoid further prevent ~~the pump radiation from propagating to penetrate~~ into the center of the vertical emission region 1. This absorption coefficient can be matched by suitably choosing the wavelength of the pump radiation compared with the wavelength of the emitted radiation from the vertical emission

region 1, which in turn, can be influenced by the composition of the material of the optically active structures in the vertical emission region 1 and the pump radiation sources 2. To achieve good pumping efficiency, the pump radiation has in this case a shorter wavelength than the radiation emitted by the vertical emission region 1.

On page 9, amend the paragraph beginning on line 32, insert the following heading:

In the exemplary embodiment in Figure 5, only one pump radiation source 2 is provided which is equipped with ~~three~~ four inner cavity facets 5 as a semiconductor ring laser. The resonator describes the form of an "8", the vertical emission region 1 being arranged at the point of intersection of the "8" in such a manner that radiation is conducted through the vertical emission region 1 from two different directions. The inner cavity facets 5 can be produced in an etching process. In the arrangement shown, the resonator radiation is incident on the inner cavity facets 5 at an angle of 22.5°. Depending on the index of refraction of the semiconductor material used, total reflection also occurs with this angle of incidence. In this case, mirror coating of the areas of the inner cavity facets 5 can be omitted and, if necessary, it can be provided only with a passivation layer. If not, metallization can be applied as reflection coating instead of the passivation layer.